National Museums of Canada Musées nationaux du Canada
Canada

IOME

ication of the National Museum of Natural Sciences

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The Museum's Gemstone Collection:

A Real Treasure

Mineral Sciences Division, NMNS

The Division's gemstone collection emphasizes Canadian materials, but also includes many specimens from areas such as South America. This smoky quartz sphere (7 cm d.) is from Minas Gerais, Brazil.

Gemstones have been highly prized possessions for thousands of years. Jade, the toughest gem, was used by prehistoric man to make tools and weapons as well as ornaments. In Mesopotamia, gem materials were fashioned into "flowers" and bracelets that were not only decorations but also meant to protect against illness. Associating gems with the months of the year goes back for centuries, and giving gemstones to mark birthdays is still a popular tradition.

A visit with Willow Wight of the Museum's Mineral Sciences Division provided me with a fascinating introduction to these exquisite products of nature. Willow explained that most gemstones are minerals that share three remarkable qualities: the beauty of their colour and sparkle, the durability that makes them resistant to breakage or deterioration through the ages, and the rarity that qualifies very few of the world's approximately 3000 known minerals as gemstones.

Cutting and polishing to bring out the beauty and personality of individual gemstones adds greatly to their value. A faceted cut (with flat faces) brings out the brilliance of transparent gems such as the diamond, while a cabochon cut (curved surfaces) is used for translucent and opaque gems such as the opal. Weight is yet another important factor and is usually measured in carats. The carat has been used in the commerce of gems for many centuries and has an interesting origin: the term comes from the Arab "qirat", which means *the fruit of the Carob-tree*. Because of the regularity of their size and weight, the seeds of this fruit were used for weighing precious stones! Today's carat weighs 200 mg; a similar term (karat) indicates the quantity of gold in alloys used for jewellery.

The Mineral Sciences Division maintains collections of 20,000 minerals, 10,000 rocks and ores and 1500 gemstones. These collections have excellent worldwide representation and contain about one-third of the mineral species known to science. The gemstone specimens include a magnificent yellow sapphire from Sri Lanka weighing 125 carats and a superb blue topaz weighing 500 carats. There is also a 189-carat moonstone with an undulating blue sheen, an exceptional weight for this kind of gem.

Benitoite, a beautiful blue gem unique to San Benito County in California, is one of the rarest specimens in the collection, which also contains jade beads and a charming jade sculpture of a frog mounted on a column of white chalcedony. Recent acquisitions include a rare 86-carat orange danburite from Madagascar and a 22-carat sinhalite from Sri Lanka. This division is truly a treasure house!

The Division's gemstone collection emphasizes Canadian materials, some of which are collected during field expeditions, but also includes many specimens from areas such as India, South America and Africa. Gems that have been cut and polished are usually purchased from dealers, although high prices limit such acquisitions; inflation over the last few years has led to a spectacular rise in the cost of gems, especially rubies, diamonds and sapphires. The yellow sapphire mentioned above is a gift from a member of the Board of Trustees of the National Museums of Canada; the Division would not have been able to purchase such a stone. Similarly, a grant from the Department of Communications under the Cultural Property Import and Export Act made possible the acquisition of a 4.05-carat faceted wollastonite from Asbestos, Quebec; without this grant this rare specimen would undoubtedly have left Canada.

The Division concentrates its purchasing on gemstones of a relatively "reasonable" price,

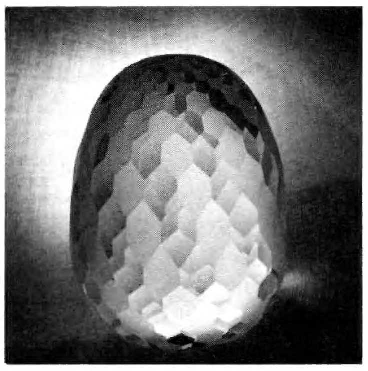
Frog carved from actinolite jade, British Columbia. The total height, including the white chalcedony pedestal, is 114 mm.

particularly gemstones that are perhaps not particularly well known by the public, but which have a great aesthetic and scientific value. These acquisitions include garnets and ammolite, one of the gem materials most recently in commercial use in Canada. Ammolite is of particular interest, as it is not a mineral, but rather the nacreous (mother-of-pearl) layer of a fossil ammonite shell found in Alberta. Ammolite shows a play of colour similar to that of an opal, exhibiting a delightful miniature "stained-glass-window" effect. The Division has also acquired synthetic stones, of which one of the most remarkable is "YAG", often used effectively to imitate diamond. It is difficult to distinguish this imitation from a real diamond with the naked eye.

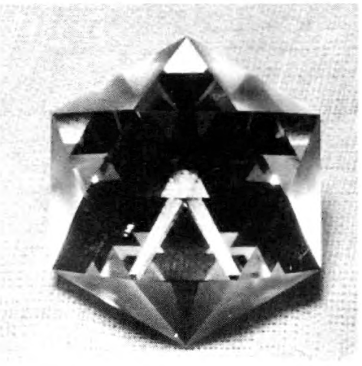
The Mineral Sciences Division possesses a truly impressive gemstone collection. At present, few of these gems are on display because of a lack of space in the Museum's exhibition galleries. Willow Wight hopes that in a few years, when the Museum has expanded into galleries vacated by the National Museum of Man, more people will be able to view these marvels that Pliny the Elder described so well:

"All of the majesty of nature is concentrated in the smallest space possible, in gemstones, and one only is sufficient to make us recognize the masterpiece of Creation".

Paule Ouellet



Quartz faceted egg (615 ct, 55 mm h.) with spiral of matte and polished facets. Made and donated by William Maloney.



Citrine quartz (173.6 ct) in the Maple Leaf Centennial cut, designed by D.P. Hartley for Canada's Centennial. Faceted and donated by L. Miller.

Sodalite from Bancroft, Ontario, on top of a sterling silver box made by C.E. Klocke. The size of the box is 49 × 35 mm.

Museum Dinosaurs Call for Help

Would you help a dinosaur in distress? We are looking for volunteers to work in the forefront or behind the scenes at the Museum. You may choose to offer your time to teach children about dinosaurs, plants, birds, mammals, fishes or rocks and minerals, or you may assist our scientific staff.

We need people with a willingness to make a time commitment for a training period starting in mid-September and for a half-day or day per week for the rest of the school year. Interest is the basic requirement; degrees are not mandatory. However, if you do have special training, we'll put it to good use.

If you wish to find out more, call Mary Anne Dancey or Pierrette McGregor at 995-9538.

We invite participation by the hearing impaired.

EDITORIAL

It would be easier if museums made sausages

A sausage factory sells sausages to get the money to pay costs and salaries to make more sausages. Museums do not work quite that way. Oh, we produce the museum equivalent of sausages all right, but they are not for direct sale. We produce knowledge, an intangible item, and one that is very difficult to sell. We offer it to our customers in the form of galleries, exhibitions (both travelling and permanent), lectures, school programmes, participatory workshops, books, posters, entertainment, research papers, documentation of specimens, field notes and a host of activities. But except for things such as popular books, posters, toys and novelties, there are very few forms of knowledge that we "sell" for cash return. This means that, unlike a commercial venture, there is no direct feedback to any of our major activities from the consumption of our products.

A really fine piece of research gains no commission such as a fine piece of marketing would do in selling sausages. A magnificent exhibition attracts many enthusiastic customers, but we do not charge them the way a butcher charges for the consumption of his sausages. For the butcher, fine sausages and good marketing have the immediate result of more money.

Alas, such a simple system is not available to museums! Certainly fine marketing and a fine "knowledge product" means more customers and exciting increased demands. Museums are full of idealistic and dedicated people who have great empathy for these requests and so try to fulfill them, but because there is no immediate return of payment, there is no money to do the greater amount of work. Instead we work at an ever-increasing pace until there is no more we can do.

Why is there no immediate feedback? Why do the masters of the museum not quickly place money at the feet of people who do fantastic research; who plan, design and build magnificent exhibits? Our money comes from our political masters, who in turn get it from their constituents in the form of tax revenues. Obvious, you say? Yes, but vitally important to remember. The politician must answer to his constituents for the money he spends. Museums compete for tax money that must support health care, road construction, defence expenses, schools, and garbage collection, all of which are important at the level of survival, and which must necessarily be funded first. There are other forms of expenditures that a politician feels are more "politically" important. He depends for his success as much on his being known as on his good decisions. We really do have a tough set of competitors in the bid for funds.

A politician cannot, therefore, respond positively merely to excellent performance, he must also weigh at least two other factors: how much "need" does society feel for this or that service, and how much difference will increased funding make to the likelihood of his being re-elected.

His advisors weigh still a third factor: how credible are the requests from the agency. This protective phalanx of advisors is in fact the first stumbling block to be overcome. All of the agency's past and present performances are considered. What of the other two factors? They are less easily measured and it is the art of a successful politician to be able to make correct judgements about societal needs and vote-getting decisions.

The politician must feel a groundswell of popular opinion supporting a demand for more resources. To be a vote-getting decision, the change in service must 1) be visible, 2) be popular with a significantly larger group of people than those with whom it will not be popular.

Because museums like ours are in this milieu, we can succeed only if the politician can take our measure on his yardsticks. Our museum has a particularly difficult row to hoe; as a national museum, our political master judges us on the basis of the whole of Canada, not on a local level, as might be the case with even important museums like the Royal Ontario Museum, which is judged only provincially. The politicians who make decisions about funding must ask what the people of the whole of Canada think about us, whether Canadians are willing to do without something else to have our museum put up new exhibits, or do more research. Certainly if only a few people across Canada are demanding more exhibits, or programmes, or books, or research, the politician would be less than clever to expend large pots of money on us. "Research? Does the museum do research?" This refrain has come to my ears so often in the years I have been associated with museums, that I have come to expect it, and am surprised when someone knows we do! It is hard to imagine a politician supporting a large-scale research effort if no one out there knows we are doing it.

Even if Canadians were aware of our full role as a knowledge-generating and disseminating institution, the politician must be convinced, not by us, but by Canadians on a grand scale, that our services are demanded by more people than those who feel it is a waste of money to keep a bunch of old bones and pickled fish.

So you see, it is more complex than selling sausages. We must first do the work to generate the knowledge; then the work to interpret and form it into all manner of packages to make it available to our customers; it must be delivered to them, not just in our buildings, but across the nation. Furthermore, there must be so many people, and they must be so enthusiastic for our "knowledge products" that the politician can sense that enthusiasm and be able to judge that throngs of voters will be delighted to forgo something else just to get our products. He must know that these people outnumber those who think museums are nice, but definitely not necessary. Finally, it must be possible for the politician to be recognized as having supported the demand from his constituents.

As a new Director, I face a challenge: our museum's ability to move into this modern interplay of political, public and institutional requirements will determine how well we fare in the future. Our museum must reach out to many Canadians with knowledge packaged so attractively they cannot resist, and quickly demand more. To do this we will make increasing use of modern technology, develop better liaison with our present audiences, popular and professional, encourage new participants in our museum programmes, and develop new ideas of what a modern museum is. To borrow a principle from nature — we will evolve.

Alan R. Emery
Director

BIOME

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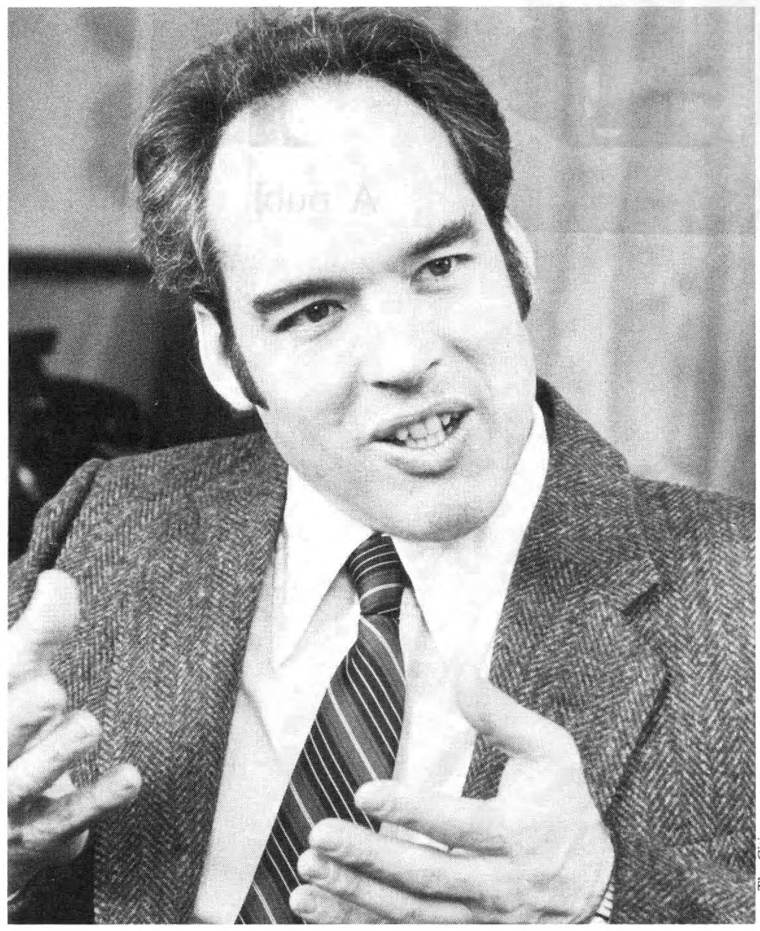
About our Director



The Citizen

Dr. Alan R. Emery joined the National Museum of Natural Sciences as Director in October, 1983, almost two years after the retirement of the former Director, Dr. Louis Lemieux.

Dr. Emery has a B.Sc. in Biology from the University of Toronto, an M.Sc. from McGill University and a Ph.D. from the University of Miami, both in Marine Sciences. Prior to his appointment as Museum Director, he was Curator of the Department of Ichthyology and Herpetology at the Royal Ontario Museum, holding simultaneous appointments as Associate Professor in the Department of Zoology and in the Faculty of Forestry and Landscape Architecture at the University of Toronto, where he taught Ichthyology, Coral Reef Ecology and Resource Management.

Dr. Emery has carried out extensive field work in tropical regions of the Caribbean, Micronesia, the South Pacific and the Indian Ocean as well as in Canada. His scientific interests are diverse, including tropical coral reef fishes, ecology and the behaviour of fishes. In his scientific papers, he has written about Atlantic mesopelagic fishes and tropical damselfishes, the structure of the ooze at the bottom of lakes, what frogs do under the ice, why some areas of the world have many and others have few species of fish, how fish "talk" to each other using sounds, and he has described several new species of fish.

Alan Emery has always had a keen interest in bringing the concepts of science to the interested but non-professional public through radio, film, television and writing; for instance, his recent popular book, *The Coral Reef,* was based upon his participation in a CBC television series: David Suzuki's *The Nature of Things*. This year he is President of Canada's oldest scientific society, The Royal Canadian Institute, which is dedicated to bringing discovery in science and the arts to the public.

Nick Bélanger
Public Services Division

A Note to our Readers

We hope that you will enjoy this issue of *BIOME*, which has been expanded to four pages so we may bring you more features about the "behind the scenes" activities of the Museum as well as articles of interest to both professional and amateur naturalists. Readers who want news about our upcoming programmes and exhibits will continue to receive these seasonal calendars of our public activities, which will henceforth be printed separately rather than making up the fourth page of our Museum newspaper.

We stated in our previous issue that the word *biome* defines a still-evolving concept for a representative ecosystem. As mentioned in Dr. Emery's editorial, the Museum (including *BIOME*) is also evolving, and we would like your feedback about the kind of features that we should carry. We are looking forward to hearing from you; *BIOME* is not only "our" newspaper — it's yours too.

Nick Bélanger
Public Services Division

Yellow Rain

About two years ago, I was unaware of the international importance of the deadly phenomenon called "yellow rain"; I didn't even know what it was.

In January 1982 I was asked by colleagues at Agriculture Canada to examine, using a microscope, some "yellow spots" on leaves collected from Laos and Kampuchea (Cambodia). Because the pollen reference collection at the National Museum of Natural Sciences is one of the world's largest collections specializing in tropical species, it was felt that I would have a better opportunity to identify the pollen types contained in the yellow spots and determine their source and significance.

Such was not the case. My examination revealed that the yellow spots contained hundreds of pollen grains produced by a wide variety of parent plants, which often occur worldwide. One pollen type was very similar to pollen of the holly family, a group of trees and shrubs with about 400 species that occurs in both temperate and tropical regions.

In April 1983, because I was one of only three palynologists worldwide who had examined the spots, I attended an international conference convened at The American Academy of Arts and Sciences (Boston, Massachusetts), bringing together 50 scientists, politicians and military staff. The purpose of the conference was to discuss some startling contentions of the U.S. State Department and their implications: that the spots, resulting from "yellow rain" in Laos and Kampuchea, are responsible for disease and death among the people of this region. And further, that this "rain" is the medium used by Soviet-backed Vietnamese forces in the deployment of biological warfare!

Why these contentions? Chemists have detected a lethal toxin called T-2 produced by the fungus *Fusarium*, which is contained along with the pollen in some spots. The questions now posed by the U.S. State Department, the U.S. Surgeon General's Office, the Canadian Department of National Defence, and the U.N. are as follows:

1) Why is there toxin associated with the pollen?

2) Is the toxin natural or man-induced?

3) Can we clearly demonstrate the cause / effect relationship of yellow rain and the known disease and deaths reported?

4) Are Vietnamese forces using the toxin as biological warfare?

5) What should the U.N. do if a connection is proven?

Two opposing viewpoints have evolved among the scientists investigating the problem. One school contends that the pollen is used as a medium to grow the deadly *Fusarium* toxin and to act as a carrier, which can be breathed by the intended victims, thus causing death.

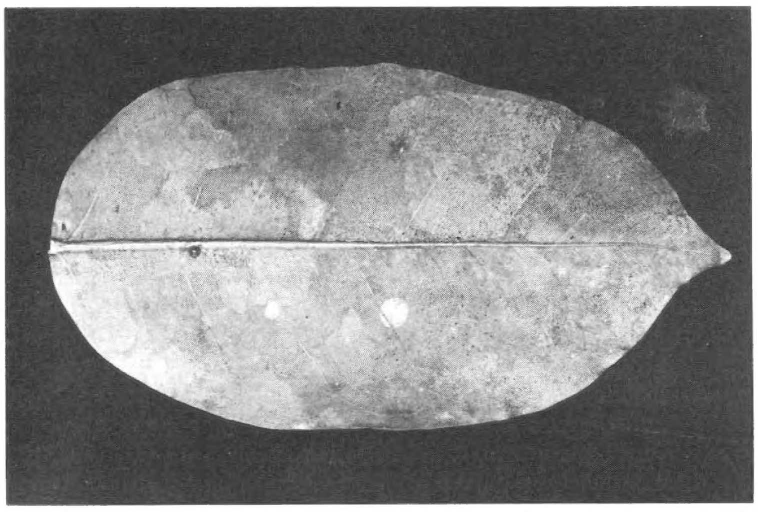
The other school believes that since *Fusarium* occurs worldwide it is coincidental, that it is "living" on the pollen and using it as a food source. And further, that the "yellow rain" itself is a natural event resulting from bees defecating within a given area. Bees are known to partake in "cleansing flights" where *en masse* they drop their faeces simultaneously. This phenomenon also occurs worldwide; beekeepers have been aware of it for centuries.

But the larger questions still remain. Why only now are *Fusarium* spores, which produce the toxin T-2, being observed in the pollen rain? Is this occurring elsewhere in the world? Are Vietnamese forces using this natural phenomenon to mask their biological warfare activities?

The debate has continued in recent articles in scientific journals and news magazines. Critical and controlled investigations of fungal mycotoxins may solve the mystery, but whatever the causes, scientists need to work out their differences and make real suggestions and proposals on how to help the people of Laos and Kampuchea. They are suffering and the effects are tragic. I have seen photographs and read reports from the Canadian Department of National Defence on the nature of the illness. It is not a pretty picture.

Conscience is at stake here. Whether the toxin is naturally occurring or man-induced, we must solve the problem of "yellow rain". It's not imaginary, it's real — and deadly.

David M. Jarzen
Paleobiology Division



R.G. Day, NMNS

Leaf with "yellow rain" spots, collected from Laos.

G.A. Neish, Agriculture Canada

*Spores of **Fusarium sporotrichioides** var. **sporotrichioides**, which produces the lethal toxin T-2.*

The "Moon-Egg" that Contained an Arctic Ground Squirrel

The Museum's Paleobiology Division has acquired an interesting specimen from the Yukon Territory which, with detailed study, could provide scientists with valuable paleoenvironmental evidence.

In 1981, in the Sixtymile area west of Dawson, placer miner Manfred Peschke was hosing down the sidebanks at Glacier Creek to reach the precious underlying layer of gold-bearing gravel when he noticed a curious egg-shaped object (about 7.5 × 11 cm) floating in the mucky waterstream. No one knew what this unusual item was and, christened with the name "moon-egg", it was passed along to Dan Drummond of the Yukon Wildlife Branch, who then contacted Dr. Dick Harington, the Museum's Curator of Quaternary Zoology. Under Dick Harington's instructions, Dan slowly dried out the specimen and carefully packed it for shipment to Ottawa.

The package Dick opened contained a dried ball of silt with bits of buffy brown fur projecting from it; a crack in one side displayed what appeared to be bone. An X-ray of this strange "moon-egg", carried out with the help of Wilf Bokman of the Canadian Conservation Institute, revealed the complete skeleton of an Arctic Ground Squirrel curled up in a nose-to-tail position, which is the common hibernating position of these animals. Dick speculates that this squirrel died during hibernation perhaps more than 10,000 years ago, near the close of the last glaciation.

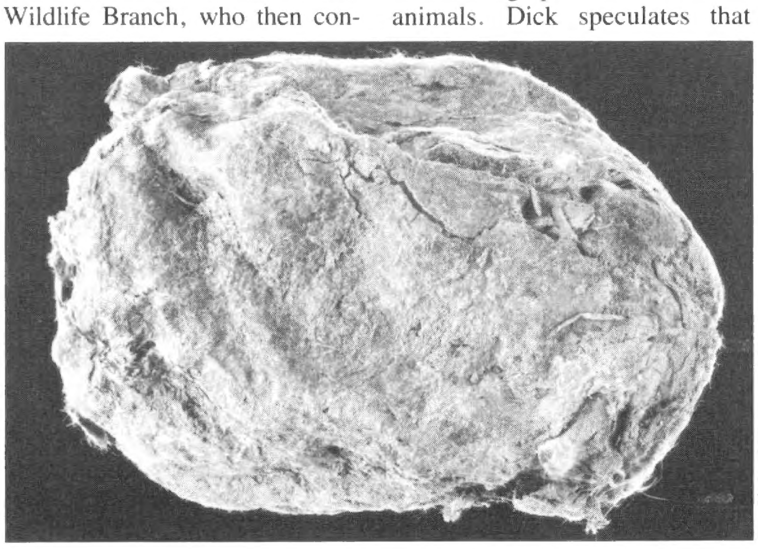
The largest and most northerly of North American squirrels, the Arctic Ground Squirrel is native to the region stretching from eastern Siberia to Hudson Bay and southwards to northwestern British Columbia. These squirrels, which have remained virtually unchanged in appearance and habits for over 10,000 years, live in colonies and hibernate approximately seven months each year in dens between 70 and 76 mm below the ground surface. Their extensive maze of tunnels, which individually may stretch up to 19 m in length, is usually found in areas along riverbanks where seasonal drainage prevents permafrost from occurring at the surface.

Arctic Ground Squirrels could be considered small furry botanists in their own right because of the wide variety of native tundra vegetation that they cache in underground "herbaria". Diet includes seeds and the roots and stems of many grasses and shrubs. Their caches can reach up to 1.8 kg of leaves and grass seeds, which the squirrels feed upon when they come out of hibernation in spring before new vegetation grows.

Evidently, the Glacier Creek ground squirrel specimen, which seems to have been preserved by a natural process of freeze-drying, was buried some 6 m below the surface. Radiocarbon dating would tell us more about how long ago this creature lived, but this type of analysis requires hundreds of grams of organic material and Dick is not prepared to destroy the delicate specimen, for it could eventually be part of an intriguing exhibition on northern paleoecology. However, clues as to its age are provided by several ground squirrel nests that have been collected from frozen organic silt in the nearby Dawson area. One example from Dominion Creek contained nesting grasses, part of a seed cache, droppings and the skeleton of a squirrel. The nesting grasses gave a radiocarbon date of about 12,000 years ago.

As paleobiological studies continue and more such nests and skeletons are discovered, scientists may soon be able to re-create a microcosm of the plant and animal life of 10,000 to 20,000 years ago. The next time that you see an unusual or curious object in your area, send it to your local museum. You may find that you have played a role in providing information needed to understand more about the natural history of our country.

Lauren Walker



National Museums of Canada

The "moon-egg" found at Glacier Creek, Yukon Territory.

An X-ray of this strange object revealed the complete skeleton of an Arctic Ground Squirrel.

Underground Whales

If you had been walking along the Green Belt in Gloucester last autumn, you would have seen pits, some almost 10 m deep. You would also have seen a crew of workers, shovels in hand, digging busily in the soil. Was it an archeological dig? A discovery of previously unknown fossils? The truth was, so to speak, more down-to-earth. These workers were carrying on an important and delicate task for the Museum; they were excavating whale skeletons buried several years ago.

David Campbell, a curatorial assistant at the Museum's Mammalogy Section, was involved in this project, whereby the skeletons were buried to clean them of residual flesh and oil so they could later be added to the Museum collections. Why were the skeletons buried rather than simply allowing the flesh to decompose on land? "When they are buried," David explained, "soil bacteria carry out a more thorough and efficient cleaning. Also, if they are left exposed, they could be damaged by calcium-hungry rodents, curious persons, freezing temperatures and other negative factors."

Could the Museum use other techniques? "If the Museum was located near the Atlantic Ocean, the sea would be an ideal medium for cleaning the skeletons, since small marine crustaceans do this much faster than soil bacteria. Although the Museum is well equipped for cleaning the skeletons of small whales, such as the beluga, in the laboratory, burying is the most efficient approach for the large species, such as the blue whale, which can reach a length of 32 m."

The whales, which died of natural causes, were provided to the Museum by the Department of Fisheries and Oceans. The project dates back to 1968, when parts of some skeletons were buried on an experimental basis. They were unearthed a year later and examined, but since they were insufficiently cleaned, they were buried again along with a second series of skeletons. A similar operation took place in 1974, and another in 1975 involving the complete skeletons of a blue whale and two killer whales. Although the cleaning procedure takes about ten years, its thoroughness makes the wait worthwhile, since all of the buried skeletons were clean and in good condition when they were finally removed in 1983.

Burying the skeletons was a relatively simple task; pits were dug with a bulldozer, the skeletons deposited, then covered. However, digging them up was a far more delicate undertaking, and the use of heavy equipment had to be avoided when digging close to the skeletons. Young people hired through the NEED programme laboriously did much of this work by hand as well as carefully removing the bones, which were up to 6 m long and 30 cm thick. And to think that we complain about shovelling our laneways during the winter!

Whales are extraordinary creatures not only because of their size, but also because of their evolution, remarkable intelligence and sophisticated means of communication. The Museum at present has over 50 whale specimens, although most are only partial skeletons; a complete skull is considered an important acquisition. The collecting and study of whale specimens allows us to learn more about these marine giants, which today are better protected thanks to international legislative measures that we hope will be respected and reinforced.

Paule Ouellet

An Acquisition from "Down Under"

Most of us have heard jokes about fishermen competing with one another with tales such as "that's nothing, you should have seen the one I caught last summer – now that was a *big* fish!" Judith Fournier of our Invertebrate Zoology Division has her own story to tell about creatures that are big and she is not talking about fish; she is talking about earthworms – giant earthworms!

While attending the First International Polychaete Conference held last summer at the Australian Museum in Sydney, Judith Fournier acquired two specimens of the giant Australian earthworm, *Megascolides australis*. One specimen is intact and is 75 cm long and approximately 2 cm in diameter; the other is incomplete but measures 70 cm long and 3 cm in diameter. This is about half their original, live, lengths. Both specimens are relatively small, given that giant Australian earthworms can reach over 3 m in length. They were collected in the Australian State of Victoria by Dr. Carl Støp-Bovitz of the University Museum, Copenhagen, and were still alive when they reached the Australian Museum, where Judith spent over an hour carefully treating them for preservation.

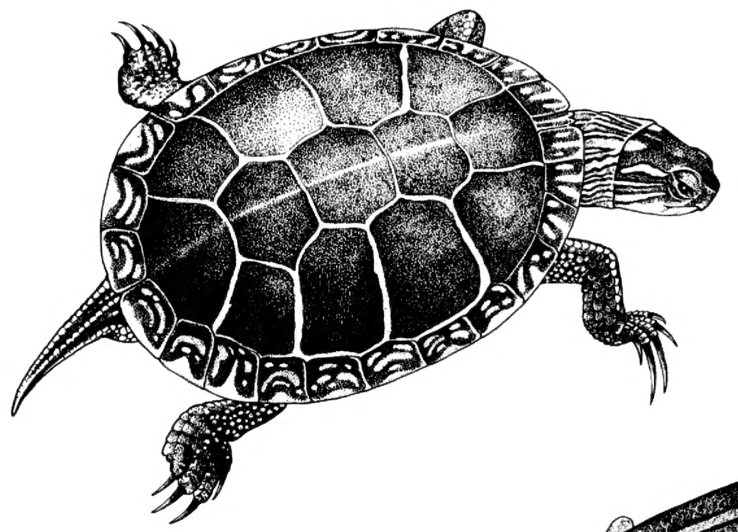
These gigantic worms are restricted to the southern Gippsland area of Victoria State. Local people have reported that they are quite common, but comparatively little is known about them. They apparently live in colonies, with each individual having its own permanent burrow, which it constructs by forcing its front end through crevices and by swallowing soil. Nutrients in the soil are absorbed into the worm's system and waste materials are discharged as a mucus that forms a lining along the burrow walls to facilitate the worm's movements, or is pushed out to form small mounds of soil above ground at the burrow entrance; an individual worm may push out as much as one tablespoonful each night. The worms move fairly quickly through their burrows by alternately contracting and extending their bodies. The continual mixing and churning actions of burrowing not only aid in drainage of excess surface water, but also ensure that the soil in the lower parts of the burrows stays damp, as moist soil is essential to the worms' survival.

These burrowing habits have led to some interesting speculations; it has been suggested that the hummocks and small rounded hills characteristic of the Gippsland area are a result of generations of worms pushing soil out of their burrows. Another theory is that the mucus lining the burrows is good for rheumatism! Detailed research is required to learn more about these mysterious giant worms, and proposals have been made to create reserves within their distribution area for scientific study. We do know that they are highly vulnerable to organic acids found in various herbicides and insecticides, and it is possible that they will be placed on the Victoria State list of endangered species.

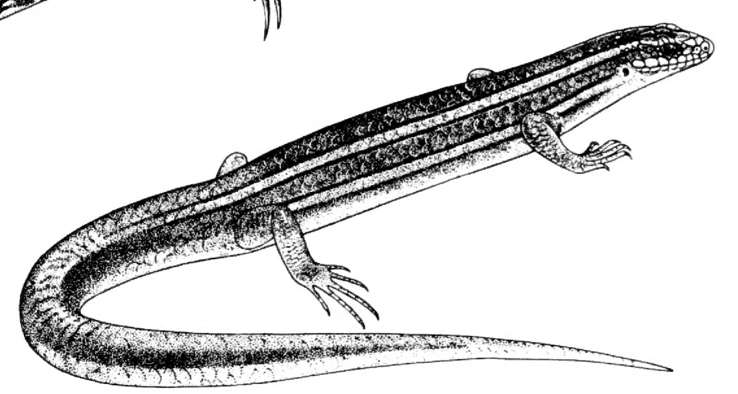
The collection of the Invertebrate Zoology Division contains over 10,000 lots of earthworms collected mostly from eastern Canada and the U.S.A., with some specimens from Mexico, Brazil and the Far East. The giant worms from "Down Under" are certainly valuable additions to this important collection.

Lauren Walker

Off the Press



Painted Turtle
(Chrysemys picta)



Western Skink
(Eumeces skiltonianus)

Each species in Dr. Cook's handbook is illustrated by C.H. Douglas, illustrator of the popular "Natural History Notebook" series.

Introduction to Canadian Amphibians and Reptiles
Francis R. Cook
200 pp., 102 illus., range maps
ISBN 0-660-10755-4, 215 × 140 mm
$12.95 (PB)
Édition française:
Introduction aux Amphibiens et Reptiles du Canada

Few people have difficulty in identifying an animal as a bird, a fish or a mammal. But they often confuse amphibians and reptiles, particularly salamanders (which are amphibians) and lizards (which are reptiles). This is mainly because many amphibians and reptiles are secretive and rarely seen – and often avoided by humans, who assume they are noxious, venomous or just plain horrid!

This handbook by Dr. Francis R. Cook, Curator of the Museum's Herpetology Section, is a readable authoritative introduction to these generally harmless and needlessly maligned animals; it is also the first which treats under one cover all species recorded in Canada. Such a comprehensive approach has long been lacking; provincial guides exist, and groups have been individually treated, but to date the most complete guides have been those that cover much of the North American continent, a situation that can confuse the reader wanting to identify or find information only on Canadian species.

Introduction to Canadian Amphibians and Reptiles is not only useful in the field; it also provides a worldwide overview of the diversity and classification of amphibians and reptiles. The characteristics of each group of Canadian amphibians and reptiles are examined, and the brief descriptions of individual species include fascinating and often humorous information. For instance, if faced with danger, the Hognose Snake will often go into simulated death throes, then lie limp, belly up. This ruse can be unmasked by turning the Hognose over – it generally will flip belly up again to show that it is really a dead snake and of no further interest to its tormentor!

Each species is illustrated in black and white by Charles H. Douglas, illustrator of the popular "Natural History Notebook" series, and its range is shown on distribution maps drafted by Joyce Crosby Cook. A chapter on field study explains how to observe particular groups as well as suitable times and locales. Also included are a comprehensive reading list for further information and a section on the care of pet amphibians and reptiles by James A. Johnston, formerly curatorial assistant in the Museum's Herpetology Section. The cover is laminated for field use. Anyone who takes an interest in natural history will find this an indispensable book.

Available through your bookstore or from the distributor:

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